

DuPont™ Voltatex® 4250

One Component Impregnating Resin

TECHNICAL DATA SHEET

Chemical base

Unsaturated polyester imide resin

Characteristics

Voltatex® low emission resins are the latest generation of one part solventless impregnating resins.

Voltatex® 4250 One Component Impregnating Resin has the following characteristics:

- low emission
- environmental friendliness
- minimal exposure in the working area
- no risk of fire or explosion

Voltatex® 4250 is specially developed for the Electrical-UV-Process. The resin can also be applied in a conventional Dip & Bake process. The cured resin compound is characterised by:

- low tendency to crack
- very good adhesion
- high elasticity
- excellent thermal and mechanical strength with outstanding long term stress endurance
- tough-hard formulation
- resistant to refrigerants

Application

Suitable for: Insulating Systems of Thermal Class H acc. to IEC 85
UL-File-No.: E 101752 (M) Underwriters Laboratories Inc, USA

- electric motors, machines, high rotating armatures and hermetic motors
- transformers, especially with heavy round- and rectangular wire windings

Delivery & Storage

Voltatex® 4250 is supplied in one-way-cans containing 25 kg, 200 kg or 1000 kg. In closed original cans the resin can be stored for more than 6 months provided storage temperature does not exceed 25 °C. Opened containers have to be closed immediately to protect the material from daylight!



Processing

Voltatex[®] 4250 is supplied ready for use and does not require the addition of extra hardener or accelerator.

Application Method

In combination with the Electrical - UV - Process Voltatex[®] 4250 allows a flexible adjustment of impregnating quality and efficiency combined with maximum gain from resin. The variety of construction of objects to be impregnated and the equipment to be used for impregnation does not allow processing information for Voltatex[®] 4250 to be detailed here. Our technicians will be pleased to provide you with all information needed and you are welcome to complement these with own trials in our Electrical-UV-application lab. Support will be given from first planning stages until your Electrical-UV-equipment is in production.

Curing

10 - 20 min at 150 °C - 180 °C depending on thermal and mechanical stress in use plus 5 - 15 min UVA-light depending on the intensity of the UV-light.

Cleaning

Cured Voltatex[®] 4250 is almost insoluble. Therefore, application equipment should be regularly cleaned with cleaner DuPont[™] Voltatex[®] 5050. All equipment cleaning and maintenance should be carried out in accordance with the equipment manufacturer's instructions.

Health & Safety

Cured Voltatex[®] 4250 is biologically inactive and not dangerous to health. When processing the liquid resin, please refer to the Material Safety Data Sheet (MSDS) for Voltatex[®] 4250 and the regulations of your local authority.

Table 1: Properties of the liquid resin	
Appearance	amber, clear to slightly cloudy
Viscosity at 25 °C acc. to DIN 53019	(2250 ± 250) mPa·s
Storage Stability, Shelf Life at 25 °C	min. 6 months
Reactivity at 100 °C acc. to DuPont™ Voltatex® Company Standard 001 ¹⁾	
Gel Time	(10,5 ± 3,0) min
Reaction Time	(11,5 ± 3,0) min
Maximum Temperature	(135 ± 15) °C
Curing Time ²⁾	10 - 20 min at 150° C - 180° C depending on thermal and mechanical stress in use plus 5 - 15 min UVA-light depending on the intensity of the UV-light
Effect on Enamelled Wire ³⁾	Compatible with all common magnet wires.

Information regarding health and precautions for the safe handling, transport regulations and labeling of this material are subjects of permanent adaptation to law regulations. They are given on the MSDS.

1) DuPont™ Voltatex® Company Standard 001 "Measurement of gel time and reaction time of 1K-Impregnating Resins" acc. to DIN 46448

2) Curing time begins when objects come up to the indicated curing temperature.
For objects having to endure high mechanical or chemical stress during service, longer curing times are recommended.

3) Test acc. to IEC 60851-4: 1996 "Winding Wires Test Methods"
part 4: Chemical Properties. The quoted solvent is replaced by the respective impregnating resin.

Table 2: Tests on cured Voltatex® 4250 acc. to IEC 60455-3-5

Curing Conditions for test specimen		1 h 150 °C
Bond Strength of Twisted Coils acc. to IEC 60455-2 Test acc. to IEC 61033, Method A Room Temperature 130 °C 155 °C 180 °C	(190 ± 40) N (50 ± 10) N (40 ± 10) N (35 ± 10) N	
Shore-D-Hardness acc. to IEC 60455-2, Test Method acc. to ISO 868 Room Temperature	(68 ± 2)	
Thermal Conductivity acc. to DIN 51046	0,23 W(m·K) ⁻¹	
Tracking Resistance acc. to IEC 60455-2, Test Method acc. to IEC 60112, paragraph 6.2	CTI 300 M - 0,44	
Electrical Strength acc. to IEC 60455-2, Test Method acc. to IEC 60243-1 at 23 °C and 50 % rel. humidity at 155 °C at 23 °C after 96 h storage at 92 % rel. humidity at 105 °C after 168 h storage in oil	≥ 80 kV/mm ≥ 80 kV/mm ≥ 65 kV/mm ≥ 95 kV/mm	
Relative Permittivity ϵ_r acc. to IEC 60455-2, Test Method acc. to IEC 60250 at 23 °C between 50 Hz and 1 MHz	(4,0 ± 0,5)	
Dielectric Dissipation Factor tan δ acc. to IEC 60455-2, Test Method acc. to IEC 60250 at 23 °C between 50 Hz and 1 MHz Intersection Point 0,2 = 200·10 ⁻³	≤ 40·10 ⁻³ ≥ 95 °C	
Volume Resistivity acc. to IEC 60455-2, Test Method acc. to IEC 60093 at 23 °C at 155 °C after 96 h Water Immersion	≥ 10 ¹⁶ Ω·cm ≥ 10 ⁹ Ω·cm ≥ 10 ¹³ Ω·cm	

Table 3: Resistance

Effect of Liquid Chemicals acc. to IEC 60455-2, Test Method acc. to ISO 175	resistant to distilled water soap solution transformer oil
Compatible with refrigerant and oil acc. to UL 984 System R 22 / Shell 22-12, Curing Conditions for test specimen: 15 min 150 °C + 30 min 180 °C	resistant

Table 4: Thermal Properties

Temperature Index acc. to IEC 60455-3-5, Test Method acc. to IEC 60216	Type 200
Bond Strength acc. to IEC 61033, Method B End-Point Criterion 22 N	IEC 60317-8/MW 30: 238 °C IEC 60317-13/MW 35: 229 °C
Proof Voltage acc. to IEC 60172	IEC 60317-8/MW 30: 212 °C IEC 60317-13/MW 35: 222 °C
Additional Test Break Down Voltage on Impregnated Glass-Fibre Fabric acc. to IEC 60243-1 End-Point-Criterion 3 kV	176 °C

Table 5: UL-Recognition

Temperature Class acc. to UL 1446		
Twisted Pair	ASTM D2307	MW 30: 200 MW 35: 220
Helical Coil	ASTM D2519	MW 30: 240 MW 35: 220
Electro Insulating Systems acc. to UL 1446 (IEC 61858)		
Class 130		C190HE R150HE Z130HE Z150HE
Class 155		C290HE CZ255HE R201HE R203HE Z200HE
Class 180		R342HE R342HE1

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